AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1   1.   (Currently amended) A method for switching packets in a passive

2 optical network which includes a central node and at least one remote node, the

3 method comprising:

4   receiving a packet at the central node;

5   obtaining a first set of results by performing a first lookup based on a first

6 set of values which include a virtual local area network (VLAN) identifier of the

7 packet;~~derived from the packet~~

8   wherein the first lookup involves directly addressing a direct-

9   search table by offsetting one or more base addresss based on the first set

10   of values;

11   wherein the direct-search table is divided into sub-tables, each of

12   which starts at a corresponding base address;

13   wherein a subset of the sub-tables are used if the packet is an

14   upstream packet;

15   wherein a subset of the sub-tables are used if the packet is a

16   downstream packet;

17   obtaining a second set of results by performing a second lookup based on a

18 second set of values derived from the packet;

19   producing a merged value by merging the first set of results and the second

20 set of results;

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21   obtaining a subsequent result by performing a subsequent lookup with the

22 merged value; and

23   if the packet is a downstream packet,

24   deriving a logical identifier corresponding to one or more remote

25   nodes from the subsequent result,

26   incorporating the logical identifier into the packet, and

27   transmitting the packet to one or more remote nodes.

1   2.   (Cancelled)

1   3.   (Cancelled)

1   4.   (Cancelled)

1   5.   (Original) The method of claim 1, wherein the second lookup

2   involves linearly searching one or more linear-search tables based on the second

3   set of values; and wherein the second set of values includes a number of bits

4   extracted from the packet.

1   6.   (Original) The method of claim 1, further comprising producing a

2   third set of results by performing a third lookup based on a third set of values

3   derived from the packet; and wherein producing the merged value involves

4   merging the first, second, and third sets of results.

1   7.   (Original) The method of claim 6, wherein the third lookup

2   involves a binary search through a working binary-search table based on the third

3   set of values.

1   8.   (Original) The method of claim 6, wherein if the packet is a

2 downstream packet, the third set of values includes a destination media access

3 control (MAC) address of the packet; and

4   wherein if the packet is an upstream packet, the third set of values includes

5 a source MAC address of the packet.

1   9.   (Original) The method of claim 8, wherein if the packet is an

2 upstream packet and if the binary-search table does not contain an entry

3 corresponding to the packet's source MAC address, the method further comprises:

4   inserting a new entry into the working binary-search table based on the

5 packet's source MAC address;

6   wherein the key of the new entry is derived from the packet's source MAC

7 address.

1   10.   (Currently amended) The method of claim 9, wherein if there is no

2 space left in the working binary-search table for inserting the new entry, the

3 method further comprises:

4   populating a shadow binary-search table with existing entries in the

5 working binary-search table and the new entry, ~~wherein the distribution of entries~~

6 ~~in the shadow binary-search table is more balanced than the working binary-~~

7 ~~search table~~;

8   converting the shadow binary-search table to an updated working binary-

9 search table; and

10   converting the prior working binary-search table to a shadow binary-search

11 table.

1   11.   (Original) The method of claim 6, wherein each of the first,

2   second, and third sets of results includes:

3   a discard value;

4   a quality of service (QoS) value;

5   a destination value; and

6   three priority numbers setting the priority of the discard value, QoS value,

7   and destination value, respectively;

8   wherein the QoS value and destination value are used to produce the

9   merged value; and

10   wherein the discard value indicates whether the merged value should be

11   discarded.

1   12.   (Original) The method of claim 11, wherein merging the first,

2   second, and third sets of results to produce the merged value involves:

3   selecting the discard value, QoS value, and destination value with the

4   highest priority among all the results;

5   if there is a tie in the priority associated with a value, performing a logical

6   "OR" operation among the tying values and setting the corresponding value to the

7   "OR" result;

8   combining the selected QoS value and destination value to produce the

9   merged value; and

10   if the selected discard filed indicates that the merged value should be

11   discarded, discarding the merged value.

1   13.   (Original) The method of claim 1, wherein the subsequent result

2   includes a queue index which specifies a queue where the packet can be stored

3   before the packet is transmitted.

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1   14.   (Original) The method claim 1, wherein the subsequent result

2   includes a logical identifier which specifies one or more remote nodes to which

3   the packet is destined if the packet is a downstream packet.

1   15.   (Original) The method of claim 1, wherein the subsequent result

2   includes a VLAN identifier.

1   16.   (Currently amended) An apparatus for switching packets in a

2   passive optical network which includes a central node and at least one remote

3   node, the apparatus comprising:

4   a receiving mechanism configured to receive a packet at the central node;

5   a first lookup mechanism configured to obtain a first set of results by

6   performing a first lookup based on a first set of values <u>which include a virtual</u>

7   <u>local area network (VLAN) identifier of the packet;</u>~~derived from the packet;~~

8   <u>wherein the first lookup involves directly addressing a direct-</u>

9   <u>   search table by offsetting one or more base addresss based on the first set</u>

10   <u>   of values;</u>

11   <u>   wherein the direct-search table is divided into sub-tables, each of</u>

12   <u>   which starts at a corresponding base address;</u>

13   <u>   wherein a subset of the sub-tables are used if the packet is an</u>

14   <u>   upstream packet;</u>

15   <u>   wherein a subset of the sub-tables are used if the packet is a</u>

16   <u>   downstream packet;</u>

17   <u>   </u>a second lookup mechanism configured to obtain a second set of results by

18   performing a second lookup based on a second set of values derived from the

19   packet;

20   a merging mechanism configured to produce a merged value by merging

21 the first set of results and the second set of results;

22   a subsequent lookup mechanism configured to obtain a subsequent result

23 by performing a subsequent lookup with the merged value; and

24   a transmission mechanism; wherein if the packet is a downstream packet,

25 the transmission mechanism is configured to:

26   derive a logical identifier corresponding to one or more remote

27   nodes from the subsequent result;

28   incorporate the logical identifier into the packet; and

29   transmit the packet to one or more remote nodes.

1   17. (Cancelled)

1   18. (Cancelled)

1   19. (Cancelled)

1   20. (Original) The apparatus of claim 16, further comprising one or

2 more linear-search tables;

3   wherein the second lookup mechanism is further configured to linearly

4 search the one or more linear-search tables based on the second set of values; and

5   wherein the second set of values includes a number of bits extracted from

6 the packet.

1   21. (Original) The apparatus of claim 16, further comprising a third

2 lookup mechanism configured to produce a third set of results by performing a

3 third lookup based on a third set of values derived from the packet; and

4   wherein the merging mechanism is further configured to merge the first,

5   second, and third sets of results

1   22.   (Original) The apparatus of claim 21, further comprising a working

2   binary-search table; and

3   wherein the third lookup mechanism is further configured to perform a

4   binary search through the working binary-search table based on the third set of

5   values.

1   23.   (Original) The apparatus of claim 21, wherein if the packet is a

2   downstream packet, the third set of values includes a destination media access

3   control (MAC) address of the packet; and

4   wherein if the packet is an upstream packet, the third set of values includes

5   a source MAC address of the packet.

1   24.   (Original) The apparatus of claim 23, wherein if the packet is an

2   upstream packet and if the binary-search table does not contain an entry

3   corresponding to the packet's source MAC address, the third lookup mechanism is

4   further configured to:

5   insert a new entry into the working binary-search table based on the

6   packet's source MAC address;

7   wherein the key of the new entry is derived from the packet's source MAC

8   address.

1   25.   (Original) The apparatus of claim 24, wherein if there is no space

2   left in the working binary-search table for inserting the new entry, the third lookup

3   mechanism is further configured to:

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4   populate a shadow binary-search table with existing entries in the working

5   binary-search table and the new entry, wherein the distribution of entries in the

6   shadow binary-search table is more balanced than the working binary-search

7   table;

8   convert the shadow binary-search table to an updated working binary-

9   search table; and

10   convert the prior working binary-search table to a shadow binary-search

11 table.

1   26.   (Original) The apparatus of claim 21, wherein each of the first,

2   second, and third sets of results includes:

3   a discard value;

4   a quality of service (QoS) value;

5   a destination value; and

6   three priority numbers setting the priority of the discard value, QoS value,

7   and destination value, respectively;

8   wherein the QoS value and destination value are used to produce the

9   merged value; and

10   wherein the discard value indicates whether the merged value should be

11 discarded.

1   27.   (Original) The apparatus of claim 26, wherein the merging

2   mechanism is further configured to:

3   select the discard value, QoS value, and destination value with the highest

4   priority among all the results;

5   if there is a tie in the priority associated with a value, perform a logical

6   "OR" operation among the tying values and set the corresponding value to the

7   "OR" result;

8   combine the selected QoS value and destination value to produce the

9   merged value; and

10   if the selected discard filed indicates that the merged value should be

11   discarded, discard the merged value.

1   28.   (Original) The apparatus of claim 16, wherein the subsequent result

2   includes a queue index which specifies a queue where the packet can be stored

3   before the packet is transmitted.

1   29.   (Original) The apparatus of claim 16, wherein the subsequent result

2   includes a logical identifier which specifies one or more remote nodes to which

3   the packet is destined if the packet is a downstream packet.

1   30.   (Original) The apparatus of claim 16, wherein the subsequent result

2   includes a VLAN identifier.

1   31.   (Currently amended) A computer-readable storage medium storing

2   instructions that when executed caused by a computer cause the computer to

3   perform a method for switching packets in a passive optical network which

4   includes a central node and at least one remote node, the method comprising:

5   receiving a packet at the central node;

6   obtaining a first set of results by performing a first lookup based on a first

7   set of values which include a virtual local area network (VLAN) identifier of the

8   packet;~~derived from the packet;~~

11

9	wherein the first lookup involves directly addressing a direct-
10	search table by offsetting one or more base addresss based on the first set
11	of values;
12	wherein the direct-search table is divided into sub-tables, each of
13	which starts at a corresponding base address;
14	wherein a subset of the sub-tables are used if the packet is an
15	upstream packet;
16	wherein a subset of the sub-tables are used if the packet is a
17	downstream packet;
18	obtaining a second set of results by performing a second lookup based on a
19	second set of values derived from the packet;
20	producing a merged value by merging the first set of results and the second
21	set of results;
22	obtaining a subsequent result by performing a subsequent lookup with the
23	merged value; and
24	if the packet is a downstream packet,
25	deriving a logical identifier corresponding to one or more remote
26	nodes from the subsequent result,
27	incorporating the logical identifier into the packet, and
28	transmitting the packet to one or more remote nodes.
1	32. (Cancelled)
1	33. (Cancelled)
1	34. (Cancelled)

1   35.   (Original) The computer-readable storage medium of claim 31,
2   wherein the second lookup involves linearly searching one or more linear-search
3   tables based on the second set of values; and wherein the second set of values
4   includes a number of bits extracted from the packet.

1   36.   (Original) The computer-readable storage medium of claim 31,
2   wherein the method further comprises producing a third set of results by
3   performing a third lookup based on a third set of values derived from the packet;
4   and wherein producing the merged value involves merging the first, second, and
5   third sets of results.

1   37.   (Original) The computer-readable storage medium of claim 36,
2   wherein the third lookup involves a binary search through a working binary-search
3   table based on the third set of values.

1   38.   (Original) The computer-readable storage medium of claim 36,
2   wherein if the packet is a downstream packet, the third set of values includes a
3   destination media access control (MAC) address of the packet; and
4   wherein if the packet is an upstream packet, the third set of values includes
5   a source MAC address of the packet.

1   39.   (Original) The computer-readable storage medium of claim 38,
2   wherein if the packet is an upstream packet and if the binary-search table does not
3   contain an entry corresponding to the packet's source MAC address, the method
4   further comprises:
5   inserting a new entry into the working binary-search table based on the
6   packet's source MAC address;

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7 wherein the key of the new entry is derived from the packet's source MAC

8 address.

1   40. (Original) The computer-readable storage medium of claim 39,

2 wherein if there is no space left in the working binary-search table for inserting

3 the new entry, the method further comprises:

4 populating a shadow binary-search table with existing entries in the

5 working binary-search table and the new entry, wherein the distribution of entries

6 in the shadow binary-search table is more balanced than the working binary-

7 search table;

8 converting the shadow binary-search table to an updated working binary-

9 search table; and

10 converting the prior working binary-search table to a shadow binary-search

11 table.

1   41. (Original) The computer-readable storage medium of claim 36,

2 wherein each of the first, second, and third sets of results includes:

3 a discard value;

4 a quality of service (QoS) value;

5 a destination value; and

6 three priority numbers setting the priority of the discard value, QoS value,

7 and destination value, respectively;

8 wherein the QoS value and destination value are used to produce the

9 merged value; and

10 wherein the discard value indicates whether the merged value should be

11 discarded.

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1   42.   (Original) The computer-readable storage medium of claim 41,

2   wherein merging the first, second, and third sets of results to produce the merged

3   value involves:

4   selecting the discard value, QoS value, and destination value with the

5   highest priority among all the results;

6   if there is a tie in the priority associated with a value, performing a logical

7   "OR" operation among the tying values and setting the corresponding value to the

8   "OR" result;

9   combining the selected QoS value and destination value to produce the

10   merged value; and

11   if the selected discard filed indicates that the merged value should be

12   discarded, discarding the merged value.

1   43.   (Original) The computer-readable storage medium of claim 31,

2   wherein the subsequent result includes a queue index which specifies a queue

3   where the packet can be stored before the packet is transmitted.

1   44.   (Original) The computer-readable storage medium of claim 31,

2   wherein the subsequent result includes a logical identifier which specifies one or

3   more remote nodes to which the packet is destined if the packet is a downstream

4   packet.

1   45.   (Original) The computer-readable storage medium of claim 31,

2   wherein the subsequent result includes a VLAN identifier.

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